Curriculum Design and Delivery of MoT Education in Malaysia: Enhancing National Innovativeness

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Abstract

Malaysian Qualifications Agency [MQA] has been set up in Malaysia to be a credible and internationally recognized quality assurance body that inspires confidence in Malaysian higher Education. It has set nine areas of standards, namely Institutional Vision, Mission and Educational Goals, Curriculum Design and Delivery, Assessment of Students, Student Selection and Support Services, Academic Staff, Educational Resources, Programme Monitoring and Review, Programme Leadership and Administration and Continual Quality Improvement in order to achieve the aim. Developing Management of Technology [MoT] Education has been the interest of many new universities particularly in Malaysia. This is due to the requirements of the national agenda to be a developed country by 2020. Hence, innovative human capitals are much needed to accomplish the mission. MoT graduates are expected to be the driving force of the Innovation-led economy. However, the competencies of MoT graduates as prescribed in the Plan in terms of the knowledge and skills are still unclear although MoT has been introduced to the country for more than 25 years. Less attention has been given to research related to MoT programs and competencies of the graduates. Thus, this paper discusses one Management of Technology [MoT] Programme in a public University including its major features and how it matches with the human capital needed for the country. This paper uses the second areas of the standard in MoT Curriculum Design and Delivery in a public University as a guide in describing the program. It adopts the structure of the standard as stated in the Code Of Practice for Programme Accreditation for the description. The result is then analyzed using Miles and Huberman [1994] techniques. The result indicated that, the knowledge and skills equipped to the MoT graduates in the institution are aligned with the needs of Malaysia's human capital to be a developed nation by the year 2020.

Key words: Management of Technology [MoT] education; Malaysian Qualification Agency [MQA].

1. Background

Some of the global trends of in the Higher Education has been identified as the substantial growth of HE-mass and diversify, greater need for accountability where we have only scarce resources, increased linkage to job market and increase emphasis on quality and quality assurance [1] As a result, it has been a national response to set up its own Quality Assurance System. Public confidence on the quality of our graduates has been long an issue. Thus, having such standards enhances the quality of higher education institutions. In addition, there's an urgent need to ensure what is produced by the higher institutions matches with what is expected by the nation i.e. to be competitive and sustainable in the global market. As a result, Malaysian Qualifications Agency [MQA] has been set up in Malaysia to be a credible and internationally recognized quality assurance body that inspires confidence in Malaysian higher Education. It has set nine areas of standards, namely Institutional Vision, Mission and Educational Goals, Curriculum Design and Delivery, Assessment of Students, Student Selection and Support Services, Academic Staff, Educational Resources, Programme Monitoring and Review, Programme Leadership and Administration and Continual Quality Improvement in order to achieve the aim.

Malaysia is aiming to be a fully developed nation by 2020. All the blueprints i.e. Ninth Malaysia Plan and Innovation Model have put forward the importance of producing innovative human capital for the development plan. Consequently, most public and private universities in Malaysia have developed many new programs have been developed in Malaysia to fulfilled the needs. One of the programs is called technology management program which had been introduced in 25 years ago. Technology management programs have been initiated in the United States of America [USA] in 1987, due to the global competition especially between the USA and Japan [1]. At that time, the need was to produce human capitals that were equipped with technical, technological and business competencies. After over 25 years managers with technological competencies have been recognized as a greater player in the knowledge-based economies [2]. Utilization of technology and strategically positioning the technology to gain competitive advantage have been the priority of many organizations [3]. State-of-art technologies are no longer the pre-requisite of an organization to compete globally. Khalil [2000] in his book, clearly stated that recognition of technologies as strategic inputs, mastering key technologies and be able to link technological aspects into other key performance indicators of an organization are three vital requirements in managing technology strategically. Hence, a program specifically in producing human capitals that is equipped with technical competence, knowledgeable in technological advancement and business functions becoming an urgent need. This paper discusses the features of one MoT program in a public University in Malaysia and maps the features of the graduates against the national agenda of Malaysia.

2. History of MoT Programs

Mot Program was first developed in the United States and the Europe as early as in the eighties [4]. Developing MoT programs has been the interest of many countries in the world. As a result, there are approximately 200 programs throughout the world offering the program. However, the titles and the contents of the programs continue to vary. Consequently, many prominent conferences, collaborations and also forums all over the world have been actively discussed on the features of MoT programs in the world. Recently, the International Association for Management of Technology [IAMOT] has formed a task force to develop a guideline to accreditate MoT programs at post graduate levels in the world. The guideline was developed through a survey among MoT stakeholders all over the world. The survey concluded that there are five knowledge groups of MoT education, which are; Management of Technology [MoT] Centered Knowledge, Knowledge of Corporate Functions, Technology-Centered Knowledge, Special Requirements/Assignments and Knowledge of Supporting Disciplines [5]. Nevertheless, it is only meant for post graduate levels and the undergraduate programs continue to have fewer attentions from the associations. There is a significant distinctive between MoT programs in developed countries and the developing countries [6]. This perhaps is due to the human capital needs and nature of the country i.e. technology user or technology provider [6].

2. 1 Relevancy of MoT human capital for Malaysia's development

In Malaysia, there are five public universities out of 21 public universities offer MoT programs at Bachelor levels. The initial intention of developing the program in Malaysia was to serve as the provider of innovative human capital in the nation's quest to become a developed country by the year 2020. This is in line with the nation's progressive development in the past 50 years, where Malaysia has emerged from a fully

[1] *Profesor Zita Mohd Fahmi, 24th. April 2010 in a MQA Worksyop*

resourced based economic into an innovated-based economy as illustrated in Figure 1.0

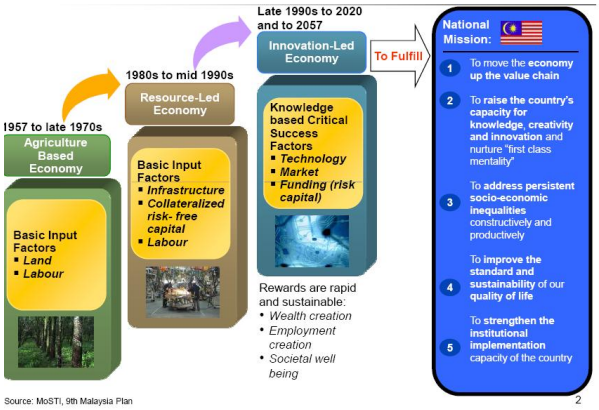


Figure 1.0: Focus of Malaysia's economic development
Source: MOSTI, 9th Malaysia Plan

Figure 1.0 clearly indicates that Malaysia has transformed into an innovation-led economy from an agricultural based one. In the 1957 until late 1970s our focus was only on agricultural input. The economy activities were mainly on land and labor. Later in the 1980s to mid 1990, we steered towards resource-Led economy. Or instance, our national car industry was introduced in the 1980s as one of the efforts towards materializing the economic mission. In the late 1990s until 2020 we then transformed our economy into an innovation led economy. We adopted a more balanced approach in executing the innovation-led economy, namely the technology driven innovation which is based on R&D activities and the market driven innovation which is based by market identified activities. These two are as illustrated in Figure 2.0.

In both strategies in the transformation of Malaysia's economy 'innovative human capital' is much needed. We want to be a technology driven innovation where most the innovation are based on the R&D activities. We can also have the innovation by a strategy market-driven innovation which the innovation is determined by the market. Indeed in both strategies we need think tanks and work force of a thorough innovative mindset, i.e. a renewed human capital built to meet the nation's economy transformational needs. The next section explains the methodology and discussions on how the second area in the MQA quality assurance standards guide the developing the MoT human capital to be aligned with national needs.

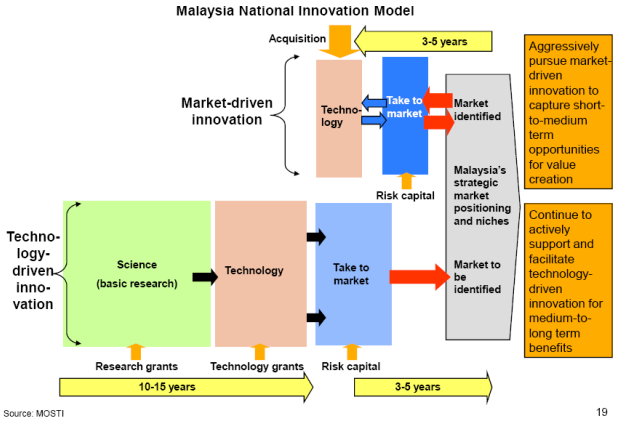


Figure 2.0 : Malaysian Innovation Model
Source: MOSTI, 9th Malaysia Plan

3. Research Methodology

This is a qualitative research which employed qualitative single-case study approach [7]. One of the MoT programs at undergraduate levels at Universiti Tun Hussein Onn Malaysia was chosen. According to Yin [2003] a case study protocol is needed to enhance the consistency of the case study research [7]. Thus, this study adopted the standard in the design and delivery set by MQA as an instrument to explain the practices in the respective institutions. The analysis was then guided by the Miles and Huberman's techniques [1994] which are data reduction, data display and drawing conclusions [8].

4. Applying Design and Delivery Standard of Quality Assurance in developing the MoT Program

In essence, the Design and Delivery quality standard of MQA has put emphasis on three important aspects namely:

(i) Sufficient autonomy to design the curriculum and allocate resources. The curriculum must be designed by a group of people who are authorized by the respective institutions and each must have the expertise in delivering the program.

The program is at degree level and is offered by one of the departments of the faculty. The department is known as Department of Technology and Management. It comprises of staff in three major disciplines. 20% of the staff are PhD holders and 80% are Masters holders. The development of the program was first instructed by the government in 2001 as part of the collective effort towards fulfilling the National Agenda to be a developed nation by year 2020. Consequently, it was aligned with the mission and vision of the

University as one of the Malaysian Technical University Network [MTUN].

(ii) Defined process for development, evaluation and review of curriculum. Program must be dynamic and aligned with the current development of the global market needs. Thus, the approaches of ensuring the program [curriculum] which complemented the current needs must be in place. For this, the active roles of stakeholders in the development and review must also be incorporated.

The program which is called Bachelor of Technology Management has undergone few reviews that resulted by the comments of the stakeholders from the ALUMNI, private sectors and even government sectors. Further amendments were carried out when MQA stipulated a pre-requisite of minimum 120 credits for undergraduate level programs, in accordance with the Malaysia Qualification Framework [2] [MQF] Program Specification, as well as to meet the fundamental three taxonomies, namely the cognitive, psychomotor and affective domains. As a result, the curriculum for this program consists of 121 credit hours.

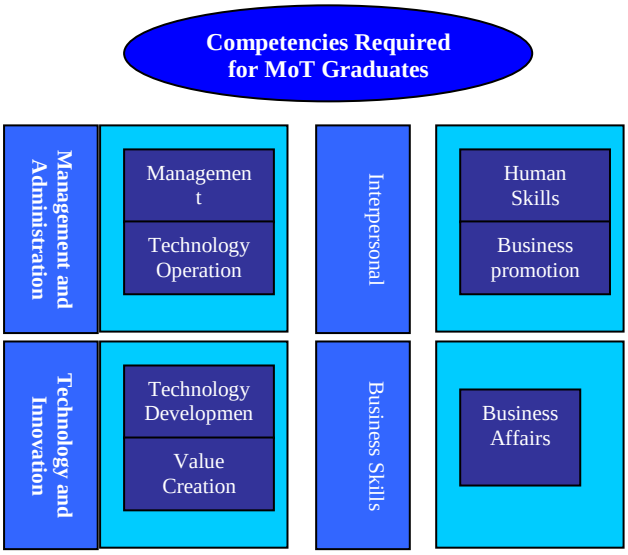
(iii) Incorporate core components to support program outcome. The Outcome Based Education [OBE] concept must be applied for each course in the program.

The program consists of 44 courses and represents 40% of business and management courses, 45% technology courses and 15% of universities courses. As mentioned the university's vision and mission is aligned with the program. The Program Education Outcome [PEO] was developed as a guide to the competencies expected from the graduates after 3 to 5 years. The Program learning outcome [PLO] were also developed to ensure the graduates fulfilled the competence in term of knowledge [cognitive], skills [psychomotor] and interpersonal skills such as communication skills, critical thinking and problem solving , teamwork skills, long life learning skills, entrepreneurship skills, ethical and leadership skills. The course learning outcome [CLO] were then developed and mapped onto the PLO.

[2] *MQF is an instrument that develops and classifies qualification that is approved nationally and at par with international practices and which clarifies the earned academic levels, learning outcomes of study areas and credit system based on student academic load.*

In a nutshell, the program aimed to produce graduates or human capital with the necessary skills and knowledge on management of technology, with a strong grasp of at least four major competencies expected of technocrats. The first competency is on managing business which comprises of business affairs and covers in related abilities in business affairs e.g. accounting, finance, and legal affairs. The second important competency is on the interpersonal skills such as abilities in human skills and business promotion e.g. ability to perform tasks etc. The third competency encompasses technology and innovation which covers the ability in technology management and value creation e.g. how to use technology in wealth creation. Last but not least is competence in management and administration which consist of the ability in management and technology operation. An example illustrating these critical competencies is shown in Figure 3.0 below.

Figure 3.0: Four core competence expected in MoT Graduates



Source: Adapted from Japan Academia-Industry Cooperation Promotion Division Ministry of Economy, Trade & Industry [2005]

5. Conclusions

This study has indicated that, the design and delivery standard of MQA has aided the Higher Learning Institution to produce MoT curriculum which could effectively produce graduates who are equipped with the necessary knowledge, skills and competencies to

facilitate enhanced innovativeness in Malaysia[3]. The graduates are trained and groomed to meet the requirements and expectations outlined in the PEO, PLO and even the CLO. In support developing national innovativeness, more consolidated effort should be planned among all the public and private universities to empower the MoT program in Malaysia. In meeting the intention, it is useful to establish networking among all the public or even private universities to collaborate in mobility programs among students in respective universities.

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[3] *Nevertheless, there another 8 important standards those are required to be fulfilled by any higher learning educations as pre-requisite before a program can be launched*